Archives of

Microbiology

Founded in 1930 as
Archiv für Mikrobiologie

Volume 143 1985/86

Managing Editors:
G. Drews · J. L. Ingraham · H.-G. Schlegel

Editorial Board

K. Altendorf, Osnabrück
A. Böck, München
V. Braun, Tübingen
N. G. Carr, Coventry
G. Drews, Freiburg i. Br.
K. Esser, Bochum
S. Fukui, Kyoto
G. Gottschalk, Göttingen
B. W. Holloway, Clayton Victoria
R. Hütter, Zürich
J. L. Ingraham, Davis
H. W. Jannasch, Woods Hole
D. P. Kelly, Coventry
E. N. Kondratieva, Moscow
D. J. Kushner, Ottawa
H. Larsen, Trondheim
B. Marrs, Annandale
B. A. Melandri, Bologna
N. Pfennig, Konstanz
H. Sahm, Jülich
M. R. J. Salton, New York
H.-G. Schlegel, Göttingen
K. Soda, Kyoto
H. Stolp, Bayreuth
R. Thauer, Marburg
H. G. Trüper, Bonn
P. M. Vignais, Grenoble

Springer International

Archives of Microbiology Journal for the Investigation of Microorganisms

was founded in 1930 by J. Behrens, F. Boas, A. Rippel. Volumes 1–94 (1973) named "Archiv für Mikrobiologie". From vol. 95 (1974) edited by H.-G. Schlegel and G. Drews; from vol. 115 (1977) – 129 (1981) edited by H.-G. Schlegel, S. C. Rittenberg, G. Drews; from vol. 130 (1982) edited by H.-G. Schlegel, J. L. Ingraham, G. Drews.

Submission of a manuscript implies: that the work described has not been published before (except in the form of an abstract or as part of a published lecture, review, or thesis); that it is not under consideration for publication elsewhere; that its publication has been approved by all coauthors, if any, as well as by the responsible authorities at the institute where the work has been carried out; that, if and when the manuscript is accepted for publication, the authors agree to automatic transfer of the copyright to the publisher; and that the manuscript will not be published elsewhere in any language without the consent of the copyright holders.

All articles published in this journal are protected by copyright, which covers the exclusive rights to reproduce and distribute the article (e.g., as offprints), as well as all translation rights. No material published in this journal may be reproduced photographically or stored on microfilm, in electronic data bases, video disks, etc., without first obtaining written permission from the publisher.

The use of general descriptive names, trade names, trademarks, etc., in this publication, even if not specifically identified, does not imply that these names are not protected by the relevant laws and regulations.

While the advice and information in this journal is believed to be true and accurate at the date of its going to press, neither the authors, the editors, nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

Special regulations for photocopies in the USA

Photocopies may be made for personal or in-house use beyond the limitations stipulated under Section 107 or 108 of U.S. Copyright Law, provided a fee is paid. This fee is US$ 0.20 per page, or a minimum of US$ 1.00 if an article contains fewer than five pages. All fees should be paid to the Copyright Clearance Center, Inc., 21 Congress Street, Salem, MA 01970, USA, stating the ISSN 0302-8933, the volume, and the first and last page numbers of each article copied. The copyright owner's consent does not include copying for general distribution, promotion, new works, or resale. In these cases, specific written permission must first be obtained from the publisher.

Other regulations

Authors publishing in this journal can, under certain conditions, benefit from library and photocopy fees collected by VG WORT. Authors resident in the Federal Republic of Germany or in West Berlin can apply to Verwertungsgesellschaft WORT, Abteilung Wissenschaft, Goethestraße 49, D-8000 München 2, for detailed information.

Springer-Verlag Berlin Heidelberg New York

Printed in Germany by Wiesbadener Graphische Betriebe GmbH, D-6200 Wiesbaden
© Springer-Verlag GmbH & Co. KG Berlin Heidelberg 1985/86

Contents

No. 1 pp. 1–104 issued on October 10, 1985
No. 2 pp. 105–208 issued on October 25, 1985
No. 3 pp. 209–312 issued on December 16, 1985
No. 4 pp. 313–404 issued on January 27, 1986

Aguilera, A., Benítez, T.
Ethanol-sensitive mutants of *Saccharomyces cerevisiae* 337

Akkermans, A. D. L., see Meesters, T. M., et al. 137

Andreesen, J. R., see Schiefer-Ullrich, H. 26

Antonov, A. S., see Ivanova, T. L., et al. 154

Babel, W., see Müller, R. H., et al. 77

Barker, H. A., see D'Ari, H. A. 311

Benítez, T., see Aguilera, A. 337

Bernard, T., Pocard, J.-A., Perroud, B., Le Rudulier, D.
Variations in the response of salt-stressed *Rhizobium* strains to betaines 359

Berry, A., see Byng, G. S., et al. 122

Bothe, H., see Neuer, G. 185

Bott, M. H., Eikmanns, B., Thauer, R. K.
Defective formation and/or utilization of carbon monoxide in H_2/CO_2 fermenting methanogens dependent on acetate as carbon source 266

Broch-Due, M., see Holo, H., et al. 94

Brussel, A. A. N. van, see Wijffelman, C. A., et al. 225

Bryant, M. P., see Krumholz, L. R. 313

Büdel, B., Rhiel, E.
A new cell wall structure in a symbiotic and a free-living strain of the blue-green alga genus *Chroococcidiopsis* (Pleurocapsales) 117

Byng, G. S., Berry, A., Jensen, R. A.
Evolutionary implications of features of aromatic amino acid biosynthesis in the genus *Acinetobacter* 122

Caballero, F. J., see Romero, F., et al. 111

Castillo, F., see Romero, F., et al. 111

Cerniglia, C. E., White, G. L., Heflich, R. H.
Fungal metabolism and detoxification of polycyclic aromatic hydrocarbons 105

Contreras, P., see Ramos, J., et al. 88

Cypionka, H., Pfennig, N.
Growth yields of *Desulfotomaculum orientis* with hydrogen in chemostat culture 396

Cypionka, H., see Klemps, R., et al. 203

D'Ari, L., Barker, H. A.
p-Cresol formation by cell-free extracts of *Clostridium difficile* 311

Deryło, M., see Skorupska, A., et al. 307

Douma, A. C., Veenhuis, M., Koning, W. de, Evers, M., Harder, W.
Dihydroxyacetone synthase is localized in the peroxisomal matrix of methanol-grown *Hansenula polymorpha* 237

Eichler, B., Schink, B.
Fermentation of primary alcohols and diols and pure culture of syntrophically alcohol-oxidizing anaerobes 60

Eikmanns, B., see Bott, M. H., et al. 266

Ettlinger, L., see Jucker, W. 283

Evers, M., see Douma, A. C., et al. 237

Feller, K., Träger, L.
Steroid-induced regulation of 3α,20β- and 3β,17β-hydroxysteroid dehydrogenase activity in wild type and mutants of *Streptomyces hydrogenans* 256

Fernández, R. A., see Fernández Velasco, J. G., et al. 192

Fernández, R., see Herrero, P., et al. 216

Fernández Velasco, J. G., Pucheu, N. L., Romero, O., Kerber, N. L., Fernández, R. A., García, A. F.
Occurrence of oscillations in ATP synthesis and hydrolysis in chromatophores of *Rhodospirillum rubrum* 192

Gall, R., see Kiener, A., et al. 147

García, A. F., see Fernández Velasco, J. G., et al. 192

Genesen, S. Th. van, see Meesters, T. M., et al. 137

Ghosh, M., Mishra, A. K.
Effect of cultural conditions on the lipid profile of *Thiobacillus ferrooxidas* 297

Gochnauer, M. B., see Johnson, K. G., et al. 365, 370

Goodwin, P. M., see Tatra, P. K. 169

Gottschalk, G., see Gottwald, M. 42

Gottschalk, G., see Menzel, U. 47

Gottschalk, G., see Wetzstein, H.-G. 157

Gottwald, M., Gottschalk, G.
The internal pH of *Clostridium acetobutylicum* and its effect on the shift from acid to solvent formation 42

Guerrero, R., see Pedrós-Alió, C., et al. 178

Gupta, S. C., Reese, C. P., Hastings, J. W.
Mobilization of cloned luciferase genes into *Vibrio harveyi* luminescence mutants 325

Häder, D.-P.
Photomovement in *Cyanophora paradoxa* 100

Harder, W., see Douma, A. C., et al. 237

Harris, J. E., Pinn, P. A.
Bacitracin-resistant mutants of a mesophilic *Methanobacterium* species 151

Hastings, J. W., see Gupta, S. C., et al. 325

Hayashi, H., see Shimada, K., et al. 244

Hecker, M., Schroeter, A., Träder, K., Mach, F.
Role of *relA* mutation in the survival of amino acid-starved *Escherichia coli* 400

Heda, G. D., Madigan, M. T.
Aspects of nitrogen fixation in *Chlorobium* 330

Heflich, R. H., see Cerniglia, C. E., et al. 105

Heindricks, R., see Loppes, R. 348

Hell, B. van, see Hommes, R. W. J., et al. 163

Hellebust, J. A.
A comparative study of sodium and osmotic requirements for growth and nutrient uptake of two related green flagellates, *Dunaliella tertiolecta* and *Chlamydomonas pulsatilla* 11

Hernandez, L. M., see Olivero, I., et al. 143

Herrero, P., Fernández, R., Moreno, F.
Differential sensitivities to glucose and galactose repression of gluconeogenic and respiratory enzymes from *Saccharomyces cerevisiae* 216

Hippe, H., see Stackebrandt, E., et al. 270

Holo, H., Broch-Due, M., Ormerod, J. G.
Glycolipids and the structure of chlorosomes in green bacteria 94

Holzer, H., see Prakash, D. 220

Hommes, R. W. J., Hell, B. van, Postma, P. W., Neijssel, O. M., Tempest, D. W.
The functional significance of glucose dehydrogenase in *Klebsiella aerogenes* 163

Hyman, M. R., Sansome-Smith, A. W., Shears, J. H., Wood, P. M.
A kinetic study of benzene oxidation to phenol by whole cells of *Nitrosomonas europaea* and evidence for the further oxidation of phenol to hydroquinone 302

Imhoff, J. F., see Tegtmeyer, B., et al. 32

Ivanova, T. L., Turova, T. P., Antonov, A. S.
DNA-DNA and rRNA-DNA hybridization studies in the genus *Ectothiorhodospira* and other purple sulfur bacteria 154

Jensen, R. A., see Byng, G. S., et al. 122

Johnson, K. G., Lanthier, P. H., Gochnauer, M. B.
Cell walls from *Actinopolyspora halophila*, an extremely halophilic actinomycete 365

Johnson, K. G., Lanthier, P. H., Gochnauer, M. B.
Studies of two strains of *Actinopolyspora halophila*, an extremely halophilic actinomycete 370

Johnson, K. G., Lanthier, P. H.
β-Lactamases from *Actinopolyspora halophila*, an extremely halophilic actinomycete 379

Jucker, W., Ettlinger, L.
The inhibition of acetate oxidation by ethanol in *Acetobacter aceti* 283

Kerber, N. L., see Fernández Velasco, J. G., et al. 192

Kerby, N. W., Rowell, P., Stewart, W. D. P.
The uptake and metabolism of methylamine by N_2-fixing cyanobacteria 353

Kiener, A., Gall, R., Rechsteiner, T., Leisinger, T.
Photoreactivation in *Methanobacterium thermoautotrophicum* 147

Kjelleberg, S., see Stenström, T.-A. 6

Klemps, R., Cypionka, H., Widdel, F., Pfennig, N.
Growth with hydrogen, and further physiological characteristics of *Desulfotomaculum* species 203

Kondratieva, E. N., see Rodionov, Y. V., et al. 345

Koning, W. de, see Douma, A. C., et al. 237

Kopecká, M., Kreger, D. R.
Assembly of microfibrils in vivo and in vitro from (1→3)-β-D-glucan synthesized by protoplasts of *Saccharomyces cerevisiae* 387

Kreger, D. R., see Kopecká, M. 387

Kroppenstedt, R., see Stackebrandt, E., et al. 270

Krumbein, W. E., see Stal, L. J. 67, 72

Krumholz, L. R., Bryant, M. P.
Syntrophococcus sucromutans sp. nov. gen. nov. uses carbohydrates as electron donors and formate, methoxymonobenzenoids or *Methanobrevibacter* as electron acceptor systems 313

Kulkarni, R. K., see Stowers, M. D., et al. 319

Kurek, E. J.
Properties of an enzymatic complex active in sulfite and thiosulfate oxidation by *Rhodotorula sp.* 277

Lanthier, P. H., see Johnson, K. G., et al. 365, 370

Lanthier, P. H., see Johnson, K. G. 379

Larriba, G., see Olivero, I., et al. 143

Le Rudulier, D., see Bernard, T., et al. 359

Lebedeva, N. V., see Rodionov, Y. V., et al. 345

Leisinger, T., see Kiener, A., et al. 147

Leisinger, T., see Meile, L., et al. 253

Lopez, M. F., Torrey, J. G.
Purification and properties of trehalase in *Frankia* Arl3 209

Loppes, R., Heindricks, R.
New arginine-requiring mutants in *Chlamydomonas reinhardtii* 348

Lorkiewicz, Z., see Skorupska, A., et al. 307

Lugtenberg, B. J. J., see Wijffelman, C. A., et al. 225

Mach, F., see Hecker, M., et al. 400

Madigan, M. T., see Heda, G. D. 330

Mandl, J., Paulus, H.
Effect of linear gramicidin on sporulation and intracellular ATP pools of *Bacillus brevis* 248

Mas, J., see Pedrós-Alió, C., et al. 178

Mayer, H., see Tegtmeyer, B., et al. 32

Meesters, T. M., Genesen, S. Th. van, Akkermans, A. D. L.
Growth, acetylene reduction activity and localization of nitrogenase in relation to vesicle formation in *Frankia* strains Cc1.17 and Cp1.2 137

Meile, L., Leisinger, T., Reeve, J. N.
Cloning of DNA sequences from *Methanococcus vannielii* capable of autonomous replication in yeast 253

Menzel, U., Gottschalk, G.
The internal pH of *Acetobacterium wieringae* and *Acetobacter aceti* during growth and production of acetic acid 47

Mishra, A. K., see Ghosh, M. 297

Moreno, F., see Herrero, P., et al. 216

Müller, R. H., Uhlenhut, G. J., Babel, W.
Flow of ^{14}C-methanol via assimilatory and dissimilatory sequences with yeast in presence of glucose 77

Neijssel, O. M., see Hommes, R. W. J., et al. 163

Neuer, G., Bothe, H.
Electron donation to nitrogenase in heterocysts of cyanobacteria 185

Okker, R. J. H., see Wijffelman, C. A., et al. 225

Olivero, I., Hernandez, L. M., Larriba, G.
Regulation of β-exoglucanase activity production by *Saccharomyces cerevisiae* in batch and continuous culture 143

Ormerod, J. G., see Holo, H., et al. 94

Paulus, H., see Mandl, J. 248

Pedrós-Alió, C., Mas, J., Guerrero, R.
The influence of poly-β-hydroxybutyrate accumulation on cell volume and buoyant density in *Alcaligenes eutrophus* 178

Pees, E., see Wijffelman, C. A., et al. 225

Perroud, B., see Bernard, T., et al. 359

Pfennig, N., see Cypionka, H. 396

Pfennig, N., see Klemps, R., et al. 203

Pierson, B. K.
Cytochromes in *Chloroflexus aurantiacus* grown with and without oxygen 260

Pinn, P. A., see Harris, J. E. 151

Pocard, J.-A., see Bernard, T., et al. 359

Pohla, H., see Stackebrandt, E., et al. 270

Postma, P. W., see Hommes, R. W. J., et al. 163

Prade, R. A., Terenzi, H. F.
Control of L-amino acid oxidase in *Neurospora crassa* by different regulatory circuits 37

Prakash, D., Holzer, H.
Effects of *m*-Cl-peroxy benzoic acid on glycolysis in *Saccharomyces cerevisiae* 220

Pucheu, N. L., see Fernández Velasco, J. G., et al. 192

Ramos, J., Contreras, P., Rodriguez-Navarro, A.
A potassium transport mutant of *Saccharomyces cerevisiae* 88

Rechsteiner, T., see Kiener, A., et al. 147

Reed, R. H., Walsby, A. E.
Changes in turgor pressure in response to increases in external NaCl concentration in the gas-vacuolate cyanobacterium *Microcystis* sp. 290

Reese, C. P., see Gupta, S. C., et al. 325

Reeve, J. N., see Meile, L., et al. 253

Rhiel, E. see Büdel, B. 117

Rodionov, Y. V., Lebedeva, N. V., Kondratieva, E. N.
Ammonia inhibition of nitrogenase activity in purple and green bacteria 345

Rodriguez-Navarro, A., see Ramos, J., et al. 88

Roitsch, T., Stolp, H.
Distribution of dissimilatory enzymes in methane and methanol oxidizing bacteria 233

Roldán, J. M., see Romero, F., et al. 111

Romanova, N. I., see Stadnichuk, I. N., et al. 20

Romero, F., Caballero, F. J., Castillo, F., Roldán, J. M.
Immunoelectrophoretic approach to the metabolic regulation of glutamine synthetase in *Rhodopseudomonas capsulata* E1F1: role of glutamine 111

Romero, O., see Fernández Velasco, J. G., et al. 192

Rowell, P., see Kerby, N. W., et al. 353

Sansome-Smith, A. W., see Hyman, M. R., et al. 302

Schiefer-Ullrich, H., Andreesen, J. R.
Peptostreptococcus barnesae sp. nov., a Gram-positive, anaerobic, obligately purine utilizing coccus from chicken feces 26

Schink, B., see Eichler, B. 60

Schink, B., see Tschech, A. 52

Schroeter, A., see Hecker, M., et al. 400

Selyakh, I. O., see Stadnichuk, I. N., et al. 20

Shears, J. H., see Hyman, M. R., et al. 302

Shiii, D. A., Wood, P. M.
Light-driven reduction of oxygen as a method for studying electron transport in the green photosynthetic bacterium *Chlorobium limicola* 82

Shimada, K., Hayashi, H., Tasumi, M.
Bacteriochlorophyll-protein complexes of aerobic bacteria, *Erythrobacter longus* and *Erythrobacter* species OCh 114 244

Skorupska, A., Deryło, M., Lorkiewicz, Z.
Role of noncarbohydrate substitutions of *Rhizobium* exopolysaccharide in nodulation process 307

Stackebrandt, E., Pohla, H., Kroppenstedt, R., Hippe, H., Woese, C. R.
16S rRNA analysis of *Sporomusa, Selenomonas,* and *Megasphaera:* on the phylogenetic origin of Gram-positive Eubacteria 270

Stadnichuk, I. N., Romanova, N. I., Selyakh, I. O.
A phycourobilin-containing phycoerythrin from the cyanobacterium *Oscillatoria* sp. 20

Stal, L. J., Krumbein, W. E.
Nitrogenase activity in the non-heterocystous cyanobacterium *Oscillatoria* sp. grown under alternating light-dark cycles 67

Stal, L. J., Krumbein, W. E.
Oxygen protection of nitrogenase in the aerobically nitrogen fixing, non-heterocystous cyanobacterium *Oscillatoria* sp. 72

Stam, H., Stouthamer, A. H., Verseveld, H. W. van
Cyanide assimilation in *Rhizobium* ORS 571: influence of the nitrogenase catalyzed hydrogen production on the efficiency of growth 196

Steele, D. B., see Stowers, M. D., et al. 319

Stenström, T.-A., Kjelleberg, S.
Fimbriae mediated nonspecific adhesion of *Salmonella typhimurium* to mineral particles 6

Stewart, W. D. P., see Kerby, N. W., et al. 353

Stolp, H., see Roitsch, T. 233

Stouthamer, A. H., see Stam, H., et al. 196

Stowers, M. D., Kulkarni, R. K., Steele, D. B.
Intermediary carbon metabolism in *Frankia* 319

Takamiya, K.
Occurrence of cytochrome *c*-554 in a facultative methylotroph, *Protaminobacter ruber* strain NR-1, during bacteriochlorophyll formation 15

Tasumi, M., see Shimada, K. et al. 244

Tatra, P. K., Goodwin, P. M.
Mapping of some genes involved in C-1 metabolism in the facultative methylotroph *Methylobacterium* sp strain AM1 (*Pseudomonas* AM1) 169

Tegtmeyer, B., Weckesser, J., Mayer, H., Imhoff, J. F.
Chemical composition of the lipopolysaccharides of *Rhodobacter sulfidophilus, Rhodopseudomonas acidophila,* and *Rhodopseudomonas blastica* 32

Tempest, D. W., see Hommes, R. W. J., et al. 163

Terenzi, H. F., see Prade, R. A. 37

Thauer, R. K., see Bott, M. H., et al. 266

Torrey, J. G., see Lopez, M. F. 209

Träder, K., see Hecker, M., et al. 400

Träger, L., see Feller, K. 256

Tschech, A., Schink, B.
Fermentative degradation of resorcinol and resorcylic acids 52

Turova, T. P., see Ivanova, T. L., et al. 154

Uhlenhut, G. J., see Müller, R. H., et al. 77

Veenhuis, M., see Douma, A. C., et al. 237

Verseveld, H. W. van, see Stam, H., et al. 196

Walsby, A. E., see Reed, R. H. 290

Weckesser, J., see Tegtmeyer, B., et al. 32

Weimer, P. J.
Thermophilic anaerobic fermentation of hemicellulose and hemicellulose-derived aldose sugars by *Thermoanaerobacter* strain B6A 130

Wetzstein, H.-G., Gottschalk, G.
A sodium-stimulated membrane-bound fumarate reductase system in *Bacteroides amylophilus* 157

White, G. L., see Cerniglia, C. E., et al. 105

White, R. H.
Biosynthesis of 5-(*p*-aminophenyl)-1,2,3,4-tetrahydroxypentane by methanogenic bacteria 1

Widdel, F., see Klemps, R., et al. 203

Wijffelman, C. A., Pees, E., Brussel, A. A. N. van, Okker, R. J. H., Lugtenberg, B. J. J.
Genetic and functional analysis of the nodulation region of the *Rhizobium leguminosarum* Sym plasmid pRL1JI 225

Woese, C. R., see Stackebrandt, E., et al. 270

Wood, P. M., see Hyman, M. R., et al. 302

Wood, P. M., see Shill, D. A. 82